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## (54) [TITLE OF THE INVENTION] LIQUID CRYSTAL CELL

(57)[ABSTRACT]

[PROBLEM TO BE SOLVED] To obtain a liquid crystal cell in which orientation is hardly disturbed by the flow of the liquid crystal during injection of the liquid crystal.

[SOLUTION] In an ST liquid crystal cell in which a pair of substrates 1, 4 having electrodes 2, 6 and orientation films 3, 7, respectively are sealed in a sealing part; a liquid crystal 11 is injected into the space between the substrates through a liquid crystal injection port 9 disposed in the sealing part; and the liquid crystal molecules are twisted and oriented by the orientation treatment of each orientation film, the liquid crystal injection port 9 is disposed in the starting side of the orientation treatment of the orientation treatment direction B on the orientation film 7 having lower stability of the pretilt angle of the orientation between the orientation films and is disposed adjacent to the corner 4a of the substrate.

[CLAIMS]

[CLAIM 1] A liquid crystal cell comprising: a first substrate having an electrode and an orientation film went through an orientation treatment and having a first orientation treatment direction at least one surface thereof; a second substrate arranged with a space from the first substrate and having an electrode and an orientation film on a surface thereof facing the electrode side of the first substrate, the orientation film being subjected to an orientation treatment, having lower stability of the pretilt angle than the first orientation treatment, and having a second orientation treatment direction; a sealing part arranged around the first and the second substrate; a liquid crystal injection port provided in a portion of the sealing part; and liquid crystal injected between the first and the second substrate through the liquid crystal injection port, wherein the injection port is disposed in the starting side of the orientation treatment of the second orientation treatment direction and is disposed adjacent to the corner of the substrate.

[CLAIM 2] The liquid crystal cell of claim 1, wherein the second substrate has a color filter layer.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[TECHNICAL FIELD WHERE THE INVENTION BELONGS] The present invention specifically relates to a liquid crystal cell in a super twist (ST) liquid crystal display device, and to the position of the liquid crystal injection port formed in the liquid crystal cell.

[0002]

[PRIOR ART] The method for injecting liquid crystal to a liquid crystal cell comes in the vacuum injection method and the dropping injection method, and of these, the vacuum injection method is mainly used because the amount of liquid crystal injection can be

controlled easily.

[0003] In the vacuum injection method, the injection port is disposed on the short-side side of the liquid crystal cell because of its manufacturing workability. However, in an ST liquid crystal display device where the liquid crystal molecules are subjected to an orientation treatment with a twist of 210 to 310 degrees, orientation is disturbed by the flow of the liquid crystal during injection of the liquid crystal, often having an unevenness of display.

[0004]

[PROBLEMS THE INVENTION IS GOING TO SOLVE] The an unevenness of display shows up remarkably in a color-display ST liquid crystal display device having a color filter in the inner surface of one of the substrates. This is because the substrate having the color filter is inferior to the substrate with no color filter in stability of the pretilt angle, and the orientation is more likely to be disturbed by the flow of the liquid crystal during injection of the liquid crystal.

[0005] In view of the aforementioned problems, the present invention has the object of obtaining a liquid crystal cell in which orientation is hardly disturbed.

[0006]

[MEANS TO SOLVE THE PROBLEMS] The present invention provides a liquid crystal cell comprising: a first substrate having an electrode and an orientation film went through an orientation treatment and having a first orientation treatment direction at least one surface thereof; a second substrate arranged with a space from the first substrate and having an electrode and an orientation film on a surface thereof facing the electrode side of the first substrate, the orientation film being subjected to an orientation

treatment, having lower stability of the pretilt angle than the first orientation treatment, and having a second orientation treatment direction; a sealing part arranged around the first and the second substrate; a liquid crystal injection port provided in a portion of the sealing part; and liquid crystal injected between the first and the second substrate through the liquid crystal injection port, wherein the injection port is disposed in the starting side of the orientation treatment of the second orientation treatment direction and is disposed adjacent to the corner of the substrate.

[0007] When liquid crystal is contacted with the surface of an orientation film went through a rubbing orientation treatment, liquid crystal molecules (director) are oriented in such a manner as to be aligned in the orientation treatment direction, and also to be raised at a fixed angle with their back to the starting side of the rubbing orientation treatment. The rising angle of the director in contact with the substrates is called a pretilt angle, which is usually 2 to 6 degrees with regard to the substrate surfaces.

[0008] The orientation is disturbed in the flow direction by the flow of the liquid crystal during injection of the liquid crystal when the liquid crystal is injected into the cell through the injection port. The reason for this is considered that the liquid crystal moving with orientability across the surface went through an orientation treatment deteriorates the power to control the orientation of the surface of the orientation film.

[0009] When the orientation treatment direction and the liquid crystal flow direction are far apart from each other, the influence becomes serious for the orientation-treated surface with low stability of the pretilt angle, and this shows up as an unevenness of display. Of this unevenness of display, slight unevenness becomes unnoticeable by an anneal orientation treatment in which the cell

is heated to a temperature higher than the transition point of the liquid crystal.

[0010] Such stability of the pretilt angle, that is, the power to control the pretilt angle and the director depends on the material of the orientation films, the method of the orientation treatment, the foundation structure and material of the orientation-treated surface.

[0011] In an ST display device having a color filter in one of the substrates, the orientation surface of the color filter side is inferior in stability of the pretilt angle to the surface with no color filter. In this case, if the liquid crystal injection direction is nearly the same as the orientation direction of the substrate with the color filter, an unevenness of display due to the flow direction during injection of the liquid crystal is not very noticeable. However, the unevenness of display becomes noticeable if the liquid crystal injection direction is far away from the orientation direction. Although in a device using no color filter, an unevenness of display may be caused due to flow orientation failure, it can be made unnoticeable by the anneal orientation treatment. However, in a device with a color filter, an unevenness of display cannot be solved sufficiently.

[0012] The present invention provides a cell structure in which the liquid crystal injection port is designed to be nearly aligned to the liquid crystal injection direction and the orientation treatment direction that is inferior in stability of the tilt angle so as to obtain a uniform display.

[0013] The present invention further provides a cell structure in which the liquid crystal injection port is disposed in the starting side of the orientation treatment of the orientation treatment direction that has poor or low stability of the tilt angle.

[0014] Although it is impossible to flow the liquid crystal so as to align the liquid crystal flow direction to the orientation direction on the entire surface of the liquid crystal cell display surface, it is possible to align the directions mostly with the use of a wider injection port. However, the liquid crystal injection port is supported by the upper and the lower substrate with less power than the sealing part, so widening it to an extreme degree or disposing it across the cell corner are vulnerable to substrate spacing disorder in parts and not preferable in terms of manufacture. Taking simplicity and workability in fabrication into consideration, an unevenness of display becomes unnoticeable when the injection port is disposed adjacent to the corner of both sides in the starting side of the orientation treatment poor in a pretilt angle, and then liquid crystal is injected therein.

[0015]

[EMBODIMENTS OF THE INVENTION] Figures 1 (a), (b) show an embodiment of the present invention; (a) are a flat view and (b) is a magnified cross sectional view.

[0016] One surface of the transparent first substrate 1 having a rectangular shape is provided with an arch-shaped transparent electrode 2 and an orientation film 3 went through an orientation treatment and having a first orientation treatment direction A. A rectangular cell is formed by combining a transparent second substrate 4 and the first substrate 1 with a space therebetween and sealing around the substrates with a sealing part 8.

[0017] The second substrate 4 is provided with the lamination of a color filter layer 5 for red, green, and blue, an arch-shaped transparent electrode 6 crossing with the electrode 2 of the first substrate at right angles, and an orientation film 7 went through an orientation treatment and having a second orientation

treatment direction B lower in stability of the pretilt angle than the first orientation treatment A.

[0018] A liquid crystal injection port 9 is disposed in a portion of the sealing part 8, which is adjacent to the corner 4a of the substrates 1, 4. A spacer 10 is diffused between the substrates to control the space between the substrates, and the liquid crystal 11 is injected through this liquid crystal injection port 9 into the space between the substrates.

[0019] The orientation treatment direction A of the orientation treatment of the orientation film 3 on the first substrate 1 goes from lower right to upper left, and the orientation treatment direction B of the orientation treatment of the orientation film 7 on the second substrate 4 goes from upper right to lower left. The liquid crystal injection port is disposed adjacent to the corner 11 of the substrate in the starting side of the orientation treatment of the second orientation treatment direction B. In other words, in the drawing, the back corner side of arrow B becomes the starting side of the orientation treatment. In the rubbing treatment, rubbing is done in this direction.

[0020] When the first and second substrates are faced to each other, the orientation treatment directions A and B cross each other at a twist angle C, that is, from 210 to 310 degrees. When nematic liquid crystal containing a chiral agent is injected, while no voltage is being applied on the electrode, an ST liquid crystal cell is formed with a twist arrangement from the first substrate 1 to the second substrate 4 at the angle C as illustrated.

[0021] The orientation treatment of the orientation film 7 on the second substrate is inferior in stability of the pretilt angle due to the presence of the color filter to the orientation film 3 on the first substrate, and the power to control the orientation is weakened by

the flow of the liquid crystal to be injected. However, the liquid crystal injection port 9 is disposed adjacent to the corner 11 of the substrate in the starting side of the orientation treatment of the second orientation treatment direction B so as to reduce the influence of the flow of the liquid crystal and suppress orientation disturbance.

[0022]

[EMBODIMENT] The embodiment of the present invention will be described as follows.

[0023] In Figure 1, a polyimide (SE-150 manufactured by Nissan Chemical Industries, Ltd) solution as the orientation film 3 was applied on the surface of the glass substrate 1 having an arch-shaped transparent electrode 2 such as ITO, burned at 250°C for 30 minutes so as to obtain a polyimide thin film having a thickness of 800A (angstroms). After that, a rubbing treatment was applied as indicated by arrow A in the drawing so as to obtain the orientation film 3. On the other hand, the counter substrate is provided with a color filter 5, and a polyimide film of the same kind was formed on the glass substrate 4 having an arch-shaped transparent electrode 6 such as ITO. Then, a rubbing treatment was applied in the illustrated direction of arrow B so as to form the orientation film 7.

[0024] Later, an epoxy-based adhesive agent containing a 6µm-diameter glass fiber was printed as the circumferential sealing agent along the circumference of the orientation film 3 on the substrate 1, while the liquid crystal injection port 9 is formed adjacent to the corner 4a at both sides in the rubbing starting side of the substrate 4 having a color filter. Then, 6µm-diameter resin balls were diffused as the spacer 10 on the surface of the glass substrate 4. The substrates were faced and bonded to each other

in a manner that the orientation films face each other and the orientation treatment directions A, B are twisted by 240 degrees, thereby completing an empty cell.

[0025] By the vacuum injection method, a color display ST liquid crystal display cell was formed by injecting and sealing the liquid crystal 11 in which 1% by weight of chiral agent (trade name:S-811) was added to a nematic liquid crystal material (trade name:ZLI-2292).

[0026] This liquid crystal cell was disposed between polarizer plates and observed to find that uniform orientation and uniform spacing were obtained on the entire surface of the cell. A driving circuit was used for display illumination to obtain a uniform and excellent display with no unevenness such as flow orientation resulting from liquid crystal injection.

[0027] (Comparative Example 1) As shown in Figure 2, for comparison with the embodiment of the present invention shown in Figure 1, a color display ST liquid crystal cell was formed by disposing the liquid crystal injection port 12 in the center of the right short side 13 and injecting and sealing liquid crystal of the same kind as in embodiment.

[0028] This liquid crystal cell was disposed between polarizing plates and observed to find that uniform spacing was formed inside the cell surface. A flow orientation due to the liquid crystal injection was seen in some parts on the cell inner surface, and when the driving circuit was connected for display illumination, there was an unevenness of display of a flow direction due to the liquid crystal injection, failing to provide excellent display. Even if an anneal orientation treatment was applied over the transition point of the liquid crystal, an unevenness of display of the flow orientation was only partly improved, failing to provide uniform

and excellent display.

[0029] (Comparative Example 2) A cell was produced by the same manufacturing method and the same cell structure as the embodiment except that the liquid crystal injection port 14 was formed at the corner in the starting side of the orientation treatment of the orientation treatment direction A of the substrate 1 having no color filter as shown in Figure 3.

[0030] This liquid crystal cell was disposed between polarizing plates and observed to find that a uniform spacing was formed inside the cell surface, but a flow orientation due to the liquid crystal injection was seen in some parts on the cell inner surface, and when the driving circuit was used for display illumination, there was an unevenness of display of a flow direction due to the liquid crystal injection, failing to provide excellent display. Even if an anneal orientation treatment was applied over the transition point of the liquid crystal, an unevenness of display of the flow orientation did not disappear, failing to provide uniform and excellent display.

[0031] The embodiment of the present invention was described hereinbefore; however, it goes without saying that the material, conditions, orientation method are not limited to those described in the embodiment, and can be applied to cells manufactured by other materials, other conditions, and other orientation methods. In addition, besides the simple matrix type as in the embodiment, it can be applied to active matrix driving system using switching elements such as TFT or MIM elements as well.

[0032]

[EFFECTS OF THE PRESENT INVENTION] According to the present invention, a large-screen liquid crystal display device having excellent orientation, uniform display, wide view angle,

high contrast, light weight, and high reliability can be obtained.

[BRIEF DESCRIPTION OF THE DRAININGS]

[Figure 1] This view depicts the embodiment of the present invention; (a) is a flat view, and (b) is a magnified cross sectional view.

[Figure 2] The flat view of Comparative Example 1.

[Figure 3] The flat view of Comparative Example 2.

[EXPLANATION OF SYMBOLS]

1: substrate

2: electrode

3: orientation film

4: substrate

4a: corner

5: color filter layer

6: electrode

7: orientation film

8: sealing part

9: liquid crystal injection port

10: spacer

11: liquid crystal

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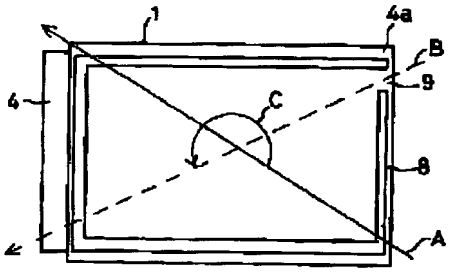
(54) **LIQUID CRYSTAL CELL**

(57) Abstract:

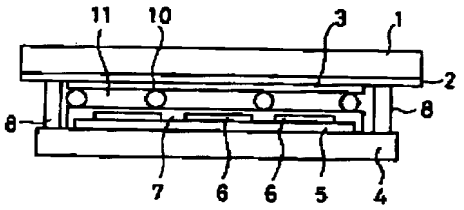
PROBLEM TO BE SOLVED: To obtain a liquid crystal cell in which orientation is hardly disturbed by the flow of the liquid crystal during injection of the liquid crystal.

SOLUTION: An ST liquid crystal cell is obtd. by sealing a pair of substrates 1, 4 having electrodes 2, 6 and orienting films 3, 7, respectively, in a sealing part and injecting a liquid crystal 11 into the space between the substrates through a liquid crystal injection port 9 disposed in the sealing part. The liquid crystal molecules are twisted and oriented by the orientation treatment of each orienting film. The liquid crystal injection port 9 is disposed in the starting side of the orientation treatment of the orientation direction (B) on the orienting film 7 having lower stability of the pretilt angle of the orientation between two orienting films and is disposed adjacent to the corner 4a of the substrate.






(a)




(b)

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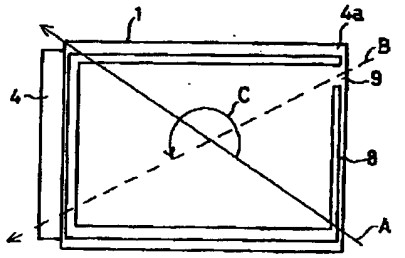
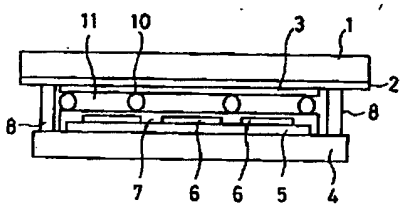
(54)【発明の名称】液晶セル

(57)【要約】
【課題】　液晶注入時の液晶流動によって配向乱れを起こしにくい液晶セルを得る。
【解決手段】　電極２，６と配向膜３，７をそれぞれ備えた一対の基板１，４を封止部で封止し、基板間に封止部に配置した液晶注入口９から液晶１１を注入し、各配向膜の配向処理により液晶分子が捩じれ配列されるＳＴ型液晶セルにおいて、各配向膜のうち配向のプレチルト角安定性の低い配向膜７の配向処理方向Ｂの配向処理開始側でかつ基板コーナー部４ａに隣接して液晶注入口９を配置する。




(a)

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【特許請求の範囲】

【請求項１】　少なくとも一面に電極と配向処理が施されて第１の配向処理方向を有する配向膜とを備えた第１の基板と、この第１の基板に間隔をおいて配置され前記第１の基板の電極側に対向する一面に電極と配向処理が施されて前記第１の配向処理よりもプレチルト角安定性の低い第２の配向処理方向を有する配向膜とを備えた第２の基板と、前記第１の基板と第２の基板の周囲に配置された封止部と、この封止部の一部に設けられた液晶注入口と、前記第１の基板と第２の基板間に前記液晶注入口から注入された液晶とからなる液晶セルにおいて、前記注入口は前記第２の配向処理方向の配向処理開始側の前記基板のコーナー部に隣接して配置されてなる液晶セル。

【請求項２】　第２の基板がカラーフィルター層を有してなる請求項１記載の液晶セル。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明はスーパーツイスト（ＳＴ）型液晶表示装置の特に液晶セルに関し、液晶セルに設ける液晶注入口の位置に係わる。

【０００２】

【従来の技術】液晶セルへの液晶注入法に、真空注入法と滴下注入法があり、このうち液晶注入量を調整することが容易なことから、主に真空注入法が利用されている。

【０００３】真空注入法において注入口の位置は製造作業性により液晶セルの短辺側に配置されている。しかし、液晶分子が２１０度から３１０度捩じれ配向処理されたＳＴ型液晶表示装置では液晶注入時の液晶流動の影響で配向乱れが生じ、しばしば表示むらが目立つ。

【０００４】

【発明が解決しようとする課題】特にカラーフィルターを一方の基板内面に有するカラー表示ＳＴ型液晶表示装置で表示むらが顕著に現われる。これはカラーフィルターを有する基板側のチルト角安定性がフィルターの無い側よりも劣っており、液晶注入時の液晶流動によって配向乱れを起こしやすいためである。

【０００５】本発明は上記問題に鑑み、配向乱れが生じにくい液晶セルを得ることを目的とする。

【０００６】

【課題を解決するための手段】本発明は、少なくとも一面に電極と配向処理が施されて第１の配向処理方向を有する配向膜とを備えた第１の基板と、この第１の基板に間隔をおいて配置され前記第１の基板の電極側に対向する一面に電極と配向処理が施されて前記第１の配向処理よりもプレチルト角安定性の低い第２の配向処理方向を有する配向膜とを備えた第２の基板と、前記第１の基板と第２の基板の周囲に配置された封止部と、この封止部の一部に設けられた液晶注入口と、前記第１の基板と第

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２の基板間に前記液晶注入口から注入された液晶とからなる液晶セルにおいて、前記注入口は前記第２の配向処理方向の配向処理開始側の前記基板のコーナー部に隣接して配置されてなる液晶セルを提供するものである。

【０００７】ラビング配向処理された配向膜表面に液晶が接すると、液晶分子（ダイレクタ）は配向処理方向に整列し、かつラビング配向処理開始側に背を向けて一定の角度で立ち上がるように配向する。基板に接するダイレクタの立ち上がり角度をプレチルト角といい、通常、基板面に対して２度から６度である。

【０００８】液晶を注入口を介してセル内に注入した場合、注入時の液晶流動により流動方向に配向乱れが生じるのは、配向処理面上を液晶が方向性をもって移動することにより、配向膜表面の配向規制力が弱まり劣化するためと考えられる。

【０００９】特にチルト角安定性の低い配向処理面に対しては、配向処理方向と液晶流動方向が大きく異なる場合に顕著に影響をうけ、表示むらとして目立つようになる。この表示むらは程度が軽いものについては液晶の転移点以上にセルを加熱するアニール配向処理により目立たなくなる。

【００１０】このようなチルト角安定性すなわちプレチルト角およびダイレクタへの規制力は、配向膜の材料、配向処理方法、配向処理面の下地構造、材質により左右される。

【００１１】一方の基板にカラーフィルターを有するＳＴ型表示装置では、カラーフィルター側の配向面はカラーフィルターがない場合に比べてプレチルト角安定性が劣っている。この場合、液晶注入方向がカラーフィルター側基板の配向方向とほぼ同じであれば、注入時の流動方向による表示むらはとくに目立たない。しかし、液晶注入方向が配向方向から大きく外れると表示むらが目立つようになる。カラーフィルターを用いない装置では流動配向不良による表示むらが起こる場合もあるが、アニール配向処理で目立たなくすることができる。しかし、カラーフィルター付きの装置では、表示むらを十分に解消できない。

【００１２】本発明は均一な表示を得るために、液晶注入口を液晶注入方向とチルト角安定性の劣っている配向処理方向と大略一致させるように配慮したセル構造を提供する。

【００１３】本発明はさらに液晶注入口をチルト角安定性の劣っている、すなわち低い配向処理方向の配向処理開始側に配置したセル構造を提供する。

【００１４】液晶セル表示面全面において、配向方向に対して液晶流動方向を一致するように液晶流動をさせることはできないが、広幅の注入口を用いると、かなり一致させることができる。しかし、液晶注入口部は封止部に比べて上下基板の支持力が弱いため極端に広くすることや、セルコーナーにまたがって配置することは、部分

的に基板間隔異常などを起こしやすく、製造上好ましくない。製造の簡便さ、製造作業性を勘案すると、液晶注入口をプレチルト角の劣っている配向処理開始方向側両辺のコーナー部に隣接するように注入口を配置し液晶を注入すると表示むらが目立たなくなる。

【００１５】

【発明の実施の形態】図１（ａ）、（ｂ）は本発明の一実施の形態を示し、（ａ）は平面図、（ｂ）は拡大断面図である。

【００１６】方形の透明な第１の基板１の一面には、櫛形の透明な電極２と、配向処理が施されて第１の配向処理方向Ａを有する配向膜３を有している。この第１の基板１に間隔をおいて透明な第２の基板４を周囲を封止材による封止部８で封止した方形のセルを形成するように配置する。

【００１７】第２の基板４は第１の基板の電極２に対向する面に、赤、緑、青用のカラーフィルター層５と、第１の基板の電極２と９０度で交差する櫛形の透明な電極６と、配向処理が施されて前記第１の配向処理Ａよりもプレチルト角安定性の低い第２の配向処理方向Ｂを有する配向膜７とを積層して備えている。

【００１８】基板１、４のコーナー部４ａに隣接する位置で封止部８の一部に液晶注入口９を配置する。基板間にはスペーサ１０が散布されて基板間隙を規制しており、この液晶注入口９から液晶１１がこの基板間隔内に注入充填されている。

【００１９】第１の基板１の配向膜３の配向処理の配向処理方向Ａは図示右下方から左上方に向き、第２の基板４の配向膜７の配向処理の配向処理方向Ｂは図示右上方から左下方に向いており、液晶注入口は第２の配向処理方向Ｂの配向処理開始側の基板のコーナー部１１に隣接して配置される。すなわち図において矢印Ｂの後端側が配向処理開始方向側になる。ラビング処理ではこの方向に沿ってラビングされる。

【００２０】第１及び第２の基板を対向させると、（ａ）のように配向処理方向Ａ、Ｂは捩じれ角Ｃすなわち２１０度乃至３１０度で交差し、カイラル剤を含むネマティック液晶を注入すると、電極への電圧無印加時に第１の基板１から第２の基板４に図示の角度Ｃのようにねじれ配列して、ＳＴ型液晶セルを形成する。

【００２１】第２の基板上の配向膜７の配向処理はカラーフィルターの存在によりプレチルト角安定性が第１の基板の配向膜３のプレチルト角安定性よりも劣っており、注入される液晶流動により配向規制力が弱められるが、液晶注入口９の位置を第２の配向処理方向Ｂの配向処理開始側の基板のコーナー部１１に隣接して配置しており、液晶流動の影響が少なく、配向乱れを生じにくい。

【００２２】

【実施例】本発明の実施例を説明する。



【００２３】図１においてＩＴＯなどの透明電極２を櫛形に形成したガラスの基板１の表面に配向膜３としてポリイミド（ＳＥ－１５０、日産化学社製）溶液を塗布し、２５０℃で３０分焼成し、膜厚８００Ａ（オングストローム）のポリイミド薄膜を得た後、図示矢印Ａのようにラビング処理を施して配向膜３を得た。一方の対向基板はカラーフィルター層５を有し同様にＩＴＯなどの透明電極６を櫛形に形成したガラスの基板４に同様のポリイミド膜を形成し、図示矢印Ｂ方向にラビング処理を施して配向膜７とした。

【００２４】この後、基板１の配向膜３周辺に沿って周辺封止剤として６μｍ径のガラスファイバーを含有したエポキシ系接着剤を液晶注入口９をカラーフィルター付きの基板４のラビング開始側両辺のコーナー部４ａに隣接して形成して印刷した。次にガラス基板４の表面にスペーサ１０として粒径６μｍの樹脂球を散布した。配向膜が対向し、配向処理方向Ａ、Ｂが２４０度捩じれるように両基板を対向させて張り合わせ空セルを形成した。

【００２５】次に真空注入法により、ネマティック液晶材料（ＺＬＩ－２２９２、商品名）にカイラル剤（Ｓ－８１１、商品名）を１重量%添加した液晶１１を注入、封止したカラー表示ＳＴ型液晶表示セルを形成した。

【００２６】この液晶セルを偏光板で挟んで観察したところ、セル全面にわたり均一な配向および均一な間隙が得られていた。さらに駆動回路により点灯表示させたところ、液晶の注入による流動配向などの表示むらのない均一で良好な表示が得られた。

【００２７】（比較例１）図２に示すように、図１の本発明の実施例に対して、液晶注入口１２の位置を右短辺１３の中央に形成し、実施例と同じ液晶を注入封止してカラー表示ＳＴ型液晶セルを得た。

【００２８】この液晶セルを偏光板で挟んで観察したところ、セル面内で均一な間隙が得られていた。、セル内面に部分的に液晶の注入による流動配向が見られ、さらに駆動回路を接続して点灯表示させたところ、液晶の注入による流動配向表示むらが発生して良好な表示が得られなかった。また、液晶の転移点以上にアニール配向処理を施しても、流動配向表示むらは部分的には程度は良くなったものの完全には消えず均一で良好な表示が得られなかった。

【００２９】（比較例２）図３に示すように液晶注入口１４をカラーフィルターのない基板１の配向処理方向Ａの配向処理開始方向側のコーナー部に形成したほかは、上記実施例と同じ製造、セル構成として形成した。

【００３０】この液晶セルを偏光板で挟んで観察したところ、セル面内で均一な間隙が得られていたが、セル面内に部分的に液晶注入による流動配向が見られ、さらに駆動回路により点灯表示させたところ、液晶の注入による流動配向などの表示むらが発生して良好な表示が得られなかった。また、液晶の転移点以上にアニール配向処

理を施しても、流動配向表示むらは消えず均一で良好な表示が得られなかった。

【００３１】以上本発明の実施例について説明したが、実施例で述べた材料、条件、配向方法に限定されるものではなく、他の材料、条件、配向方法によるセルについても同様に適用できることはいうまでもない。また、実施例のような単純マトリクス型ばかりでなく、ＴＦＴやＭＩＭ素子などのスイッチング素子を使用したアクティブマトリクス型駆動方式にも同様に適用されるものである。

【００３２】

【発明の効果】本発明によれば、良好な配向、表示の均一性、広い視野角、高コントラスト、薄型軽量、高信頼性の大画面表示液晶表示装置を得ることができる。

【図面の簡単な説明】

【図１】本発明の実施の形態を説明するもので、（ａ）は平面図、（ｂ）は拡大略断面図である。



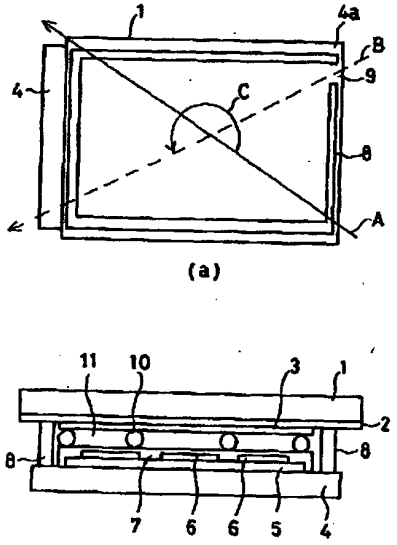
【図２】比較例１の平面図である。

【図３】比較例２の平面図である。

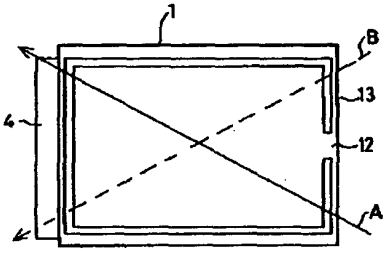
【符号の説明】

１：　基板
２：　電極
３：　配向膜
４：　基板
４ａ：コーナー部
５：　カラーフィルター層
６：　電極
７：　配向膜
８：　封止部
９：　液晶注入口
１０：スペーサ
１１：液晶

【図１】




【図２】




【図３】